ORTEC®

ISO-CART™
Mobile Assay System

A Complete *In-Situ* NDA Gamma-Ray Analysis for a Wide Variety of Samples

- **Measures all common geometries: pipes, cylinders, floors, ceilings, walls, drums, and boxes**
- **Uranium and plutonium holdup measurement**
- **Proven results on thousands of real-world samples**
- **Easy-roll cart for maneuvering over any surface**
- **Simple calibration with an inexpensive single point source**
- **Wide selection of collimators and shields available for different measurement situations**
- **Variable detector orientation: height and tilt**
- **Flexible reporting: measurement results can be reported in grams or activity (Bq or Ci)**

PerkinElmer™
Instruments.

Introduction

The ISO-CART Mobile NDA System is an ideal solution for a wide variety of *in-situ* gamma-ray measurement requirements. The hardware comprises a specially-designed cart which carries all the components: HPGe detector, shield and collimator, DigiDART™ high performance multichannel analyzer, and laptop computer. The system software package provides everything necessary to produce quantitative results quickly and easily "right out of the box."

Calibration is a simple procedure, requiring only the use of a single point, mixed isotope source. The patented ORTEC automatic energy calibration technique and automatic efficiency calibration make setup a breeze. ANY standard HPGe detector may be used with the ISO-CART system. No special factory calibrations are required.

The ISO-CART allows the entire assay system to be easily transported to any measurement location.The large wheels permit easy movement over rough surfaces. The detector support can be positioned at heights from 0.38 m (15 in.) to 1.2 m (48 in.).The pivot mechanism orients the detector at different angles from 0 to 180°. A sturdy adjustable shelf supports the electronics and the notebook computer for convenient on-the-cart operation. An additional shelf is available at the bottom of the ISO-CART, and is easily removed for *in-situ* soil measurements.Two tire options are available, solid and pneumatic.The solid tire works well on hard surfaces such as concrete. The pneumatic tire works best on rough terrain or soil. Brakes are included with both tire options.

If the detector must be moved to a location where it is impractical to move the cart, the detector/collimator unit can be removed and carried.The collimator may be easily removed for “infinite-plane” soil measurements.

Collimators

Three different collimators are available for use in most analysis situations. The light-duty collimator is supplied with the basic system.

(1) The light-duty collimator is 1.6 cm (0.625 in.) thick and 20.3 cm (8 in.) in length. It is composed of lead with a 2 mm (0.08 in.) copper liner. The collimator thickness and length improves the sensitivity of the measurement system.*

(2) The medium-duty collimator is 1.3 cm (0.5 in.) thick and 20.3 cm (8 in.) in length. It is composed of tungsten-copper alloy with a 2 mm (0.08 in.) copper liner for better shielding characteristics while maintaining a small volume assembly.*

(3) A heavy-duty collimator is available for high radiation areas. The collimator is 5.1 cm (2 in.) thick and 20.3 cm (8 in.) in length, with a 2 mm (0.08 in.) copper liner.* All collimators include a copper liner to reduce fluorescence X-rays from high-Z shield materials. The larger shields are made in sections, to allow the shield assembly to be removed from the cart by one person. No lead is exposed.

*Dimensions are typical and subject to change.

ORTEC Portable HPGe Detectors

ORTEC HPGe detectors are the industry standard in terms of quality and performance. The ISO-CART system may be configured with a wide variety of ORTEC HPGe detectors from which relative efficiencies of over 200% are available.The latest SMART-1 technology raises the bar in ensuring spectral data acquired is of the highest quality, via an internal state of health function which monitors the detectors performance parameters.

Dewar Options

A portable, all-attitude HPGe detector is available with a 3-0 liter Gamma Gage dewar. A new 7.0-liter multi-orientation dewar (MOD) is also available. The MOD dewar allows near all attitude use while offering reduced size compared to the equivalent holding time Gamma Gage model. Typically, the HPGe detector chosen would be a large volume GEM (P-type) or GMX (N-type); however, a wide variety of detector choices are available.

Standard systems may be ordered by model number located on the back of this brochure. Contact us to suggest a configuration according to your detection limit and count-time requirements.

Data Acquisition Hardware

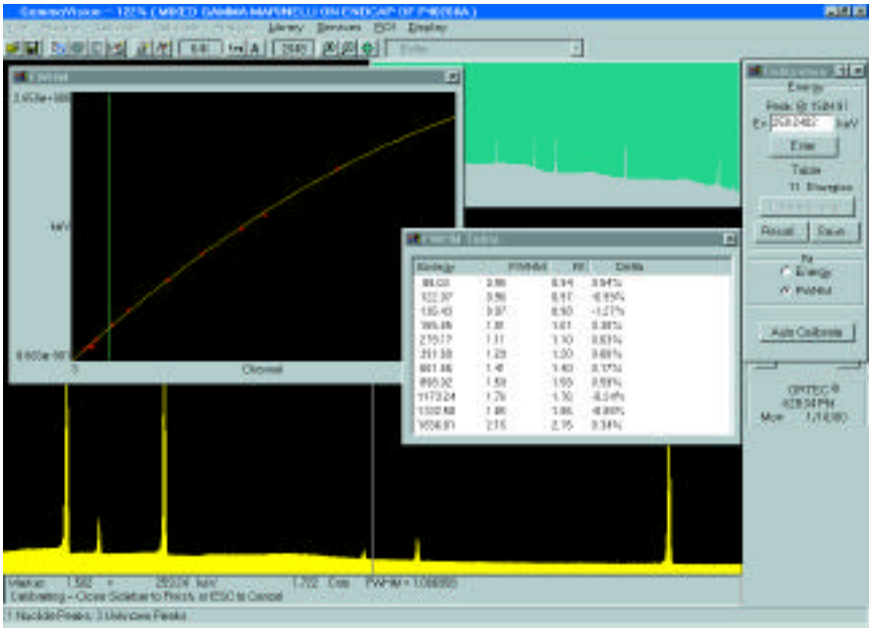
DigiDART™

The DigiDART is the ideal MCA for use with an ISO-CART system. It can acquire preliminary data in the field as a stand alone unit or perform a complete *in-situ* analysis with the use of a notebook computer.

- High-performance rugged HPGe grade spectrometer, 16k channels
- Digitally stable: consistent answers for long counts, changing count-rates and temperatures
- Operates with or without an attached PC
- Built-in backlit LCD display and control keypad — live display of acquiring data
- Energy calibration using keypad
- Nuclide ID and activity calculation for nine Regions of Interest (ROI)
- High throughput — over 100,000 processed pulses per second
- Fits in the palm of your hand or attaches to your belt
- Holds 23 16k spectra in internal memory (614 at 512 resolution)
- ~9 hour battery life, recharge internally
- Only 860 grams, including batteries
- Fast USB communications
- Supports the latest generation "SMART-1" HPGe detectors and all other detectors using the Detector Interface Module (DIM)
- Provides authentication of spectral data
- Optional 32k-channel resolution model

System Calibration

The system is designed to allow the user to calibrate the detector. The only calibration necessary is a traceable mixed-nuclide source positioned 30 cm or greater from the face of the detector. The detector calibration is implemented through GammaVision-32. (No special factory calibrations are needed.)



Expert-System Energy Calibration for GammaVision

Spectrum Analysis Software

GammaVision Software

GammaVision-32 version 5.2 or later is the primary control and analysis software which computes the uncorrected peak areas. It features a host of advanced capabilities which are covered in a separate brochure, available upon request.

Program Isotopic

Isotopic is a general-purpose modeling program which allows the user to easily configure the item to be measured for size, matrix content, container configuration and detector position. It converts the activity of a peak area, determined through GammaVision, to sample activity or quantity. It is designed for simple operation and accurate analysis. Data results can be printed, stored to disk, or output to a Microsoft Excel spreadsheet for archive and retrieval.

Sample Geometries: Isotopic allows up to 12 predefined geometries for quick setup and analysis. In addition, any of these geometries can be adjusted by the operator at the time of analysis to accommodate any sample, anywhere, anytime!

Typical Sample Geometries . . .

200 liter (55 gallon) drums

B-25 box 1.2 x 1.2 x 1.8 m (4 x 4 x 6 ft)

Far-field planes such as soil or walls

Holdup in pipe and duct work (rectangular or cylindrical)

Fine Tuning Adjustments: Isotopic has a unique fine-tune adjustment of the correction factors. After all correction factors, including branching ratios, are implemented, all peak areas of a nuclide should be the same. These peak areas are plotted relative to a reference value and a trend with energy is noted. Adjustments to density and container attenuation and self attenuation (for uranium) can be made dynamically. When all points (corrected peak areas) are aligned, the user can be satisfied that the correction factors are correct.

Results: Results are displayed as a summary page for the user to observe before storing them.The simple interaction with the system hides the immense power of the software, which has been proven through analysis of thousands of real-world samples.

ISO-CART™ Accessories

Optional Auxiliary Battery Pack

The battery pack carrying case has a hinged shelf which provides a platform for the laptop computer while the DigiDART™, sealed lead acid battery, and charger are located within the case under the shelf. The lead acid battery supplements the internal batteries of the DigiDART and will support the whole system for up to ten hours of continuous operation. Alternatively, the DigiDART can be operated from its internal batteries. The system can be recharged overnight for full operation the next day. (Supplemental power to the DigiDART is not necessary.)

Extra Shelf

An extra shelf is always useful! While working in the field, an additional shelf may be needed to hold clipboards, the MCA, cables, or supporting tools. Like the standard shelf included with the system, this extra shelf can be positioned at any height facing either the front or back of the cart.

Mechanical Specifications

Cart with PLS-W-2 1.6 cm (0.625 in.) lead shield: 122 cm (48 in.) H x 55 cm (21.75 in.) W x 101 cm (40 in.) D.

Weight: cart alone = 25 kg (55 lbs), cart and shield = 42 kg (92 lbs)

PLS-W-2 Shield (lead; includes mount for HPGe detector): 26.42 cm (10.4 in.) H x 20 cm (8 in.) W x 77.5 cm (30.5 in.) D; (shield/collimator section: 20 cm (8 in.) in length 1.6 cm (0.625 in.) wall thickness). Weight: 16.82 kg (37 lbs)

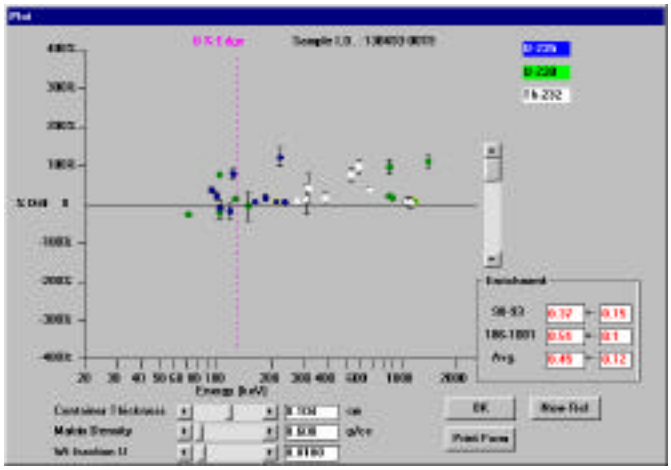
PLS-W-3 Shield (tungsten copper alloy; includes mount for HPGe detector): 26.68 cm (10.5 in.) H x 2 cm (8 in.) W x 77.5 cm (30.5 in.) D; (shield/collimator section: 20 cm (8 in.) in length 1.6 cm (0.625 in.) wall thickness). Weight: 27.27 kg (60 lbs)

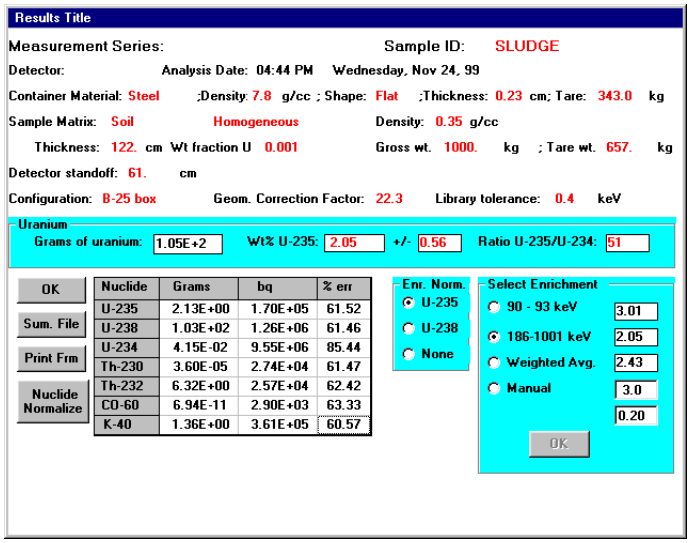
PLS-W-4 Shield (heavy duty lead; includes mount for HPGe detector): 25 cm (9.75 in.) H x 20 cm (8 in.) W x 77.5 cm (30.5 in). D; (shield/collimator section: 20 cm (8 in.) in length 5.1 cm (2 in.) wall thickness). Shield is split in two sections for assembly purposes. Weight: 68 kg (150 lbs).

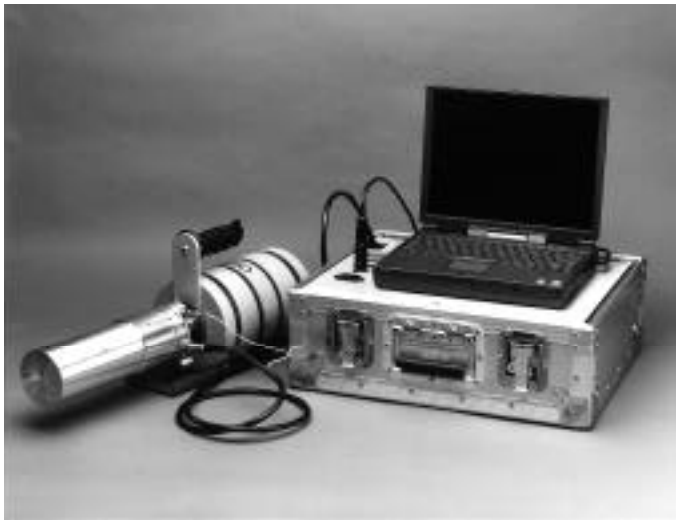
Battery Pack Carrying Case: 61 cm (24 in.) W x 30.5 cm (12 in.) H x 30.5 cm (12 in.) D.

Weight: 19.5 kg (43 lbs)

DigiDART: 12 x 8.2 x 3.3 cm (4.7 x 3.2 x 1.3 in). Weight: 900 g (2.4 lbs) with battery







Ordering Information

To fully specify your choice of ISO-CART system, select the model number below for the size of detector needed and replace the letters DDD in the model number with the desired choice of dewar, as follows:

1.2 = 1.2-liter Gamma Gage dewar; **3.0** = 3.0-liter Gamma Gage dewar; **5.0** = 5.0-liter Gamma Gage dewar; **M3L** = 3.0-liter MOD dewar; **M7L** = 7.0-liter MOD dewar

Other configurations may be supplied on request. Your existing detectors may be used. Contact your ORTEC representative or e-mail info_ORTEC@perkinelmer.com with your requirements.

Description

Includes detector with SMART-1 technology, cart with PLS-W-2 and solid tires, DigiDART, A66-B32, ISO-B32, Point Source Calibration and setup of ISO-B32 at the factory, and laptop computer.

Model No.

ISO-CART-GEM25-DDD	ISO-CART Mobile Assay System incorporating GEM25 detector
ISO-CART-GEM40-DDD	ISO-CART Mobile Assay System incorporating GEM40 detector
ISO-CART-GEM60-DDD	ISO-CART Mobile Assay System incorporating GEM60 detector
ISO-CART-GEM80-DDD	ISO-CART Mobile Assay System incorporating GEM80 detector
ISO-CART-GMX25-DDD	ISO-CART Mobile Assay System incorporating GMX25 detector
ISO-CART-GMX40-DDD	ISO-CART Mobile Assay System incorporating GMX40 detector
ISO-CART-GMX60-DDD	ISO-CART Mobile Assay System incorporating GMX60 detector
ISO-CART-GMX80-DDD	ISO-CART Mobile Assay System incorporating GMX80 detector

ISO-CART System Options

ISO-CART	Cart only
ISO-CAL	Point-source calibation at the factory
ISO-CASE	Carrying case with extended life battery for laptop computer
ISO-PNU	Pneumatic tire option
ISO-SHELF	Additional shelf
M1-T-1	Variable-length Tripod for In-Situ Soil Measurements
PLS-W-3	Tungsten Shield
PLS-W-4	Heavy Duty Lead Shield (2” thick) for high contamination areas

NOTE: Contact factory for ISO-CART systems based on PROFILE Series detectors

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